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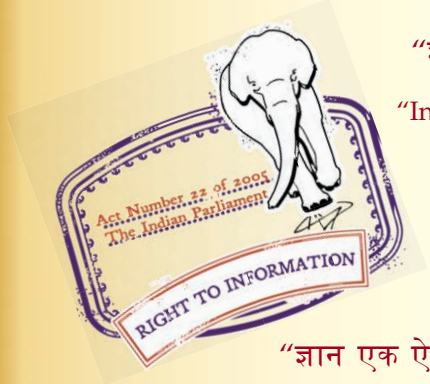
IS 12327-1 (1988): Data Interchange on 130 mm flexible disk cartridges using modified frequency modulation recording at 13 262 ftprad on 80 tracks on each side, Part 1: Dimensional, physical and magnetic characteristics [LITD 16: Computer Hardware, Peripherals and Identification Cards]



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"ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है"
Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

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IS 12327 (Part 1) : 1988
ISO 8630-1 : 1987
(Reaffirmed 2003)

Indian Standard

INFORMATION PROCESSING—DATA INTERCHANGE ON 130 mm FLEXIBLE DISK CARTRIDGES USING MODIFIED FREQUENCY MODULATION RECORDING AT 13 262 ftprad. ON 80 TRACKS ON EACH SIDE

PART 1 DIMENSIONAL, PHYSICAL AND MAGNETIC CHARACTERISTICS

UDC 681·327·634 : 621·798·11-52

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

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Indian Standard

INFORMATION PROCESSING—DATA INTERCHANGE ON 130 mm FLEXIBLE DISK CARTRIDGES USING MODIFIED FREQUENCY MODULATION RECORDING AT 13 262 ftprad, ON 80 TRACKS ON EACH SIDE

PART 1 DIMENSIONAL, PHYSICAL AND MAGNETIC CHARACTERISTICS

NATIONAL FOREWORD

This Indian Standard (Part 1), which is identical with ISO 8630-1 : 1987 'Information processing — Data interchange on 130 mm (5·25 in) flexible disk cartridges using modified frequency modulation recording at 13 262 ftprad, on 80 tracks on each side — Part 1 : Dimensional, physical and magnetic characteristics,' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on 10 February 1988 on the recommendation of the Computers, Business Machines and Calculators Sectional Committee (LTDC 24), and approval of the Electronics and Telecommunication Division Council.

In the adopted standard certain terminology and conventions are not identical with those used in Indian Standards, attention is specially drawn to the following:

Wherever the words 'International Standard' appear, referring to this standard, they should be read as 'Indian Standard'.

CROSS REFERENCES

International Standard	*Corresponding Indian Standard*	*Degree of Correspondence*
ISO 646 : 1983 Information processing — ISO 7-bit coded character set for information interchange	IS : 10315-1982 7-bit coded character set for information interchange	Technically equivalent
ISO 2022 : 1986 Information processing — iSO 7-bit and 8-bit coded character sets — Code extension techniques	IS : 12326-1987 7-bit and 8-bit coded character sets Code extension techniques	Technically equivalent
ISO 4873 : 1986 Information processing — ISO 8-bit code for information interchange — Structure and rules for implementation	IS : 10401-1982 8-bit coded character set for information interchange	Technically equivalent
ISO 7665 : 1983 Informatiom processing — File structure and labelling of flexible disk cartridges for information interchange	IS : 11406-1986 File structure and labelling of flexible disk cartridges for information interchange	Technically equivalent

The Computers, Business Machines and Calculators Sectional Committee has reviewed the provisions of the following ISO Standards and has decided that they are acceptable for use in conjunction with these standards:

ISO 6429 : 1983 Information processing — ISO 7-bit and 8-bit coded character sets — Additional control functions for character-imaging devices

ISO 9293 : 1987 Information processing — Volume and file structure of flexible disk cartridges for information interchange

0 Introduction

ISO 8630 specifies the characteristics of 130 mm (5.25 in) flexible disk cartridges recorded at 13 262 ftprad, using modified frequency modulation (MFM) recording, on 80 tracks on each side.

ISO 8630-2 and ISO 8630-3 each specify the quality of recorded signals, the track layout, and a track format to be used on 130 mm (5.25 in), 13 262 ftprad flexible disk cartridges intended for data interchange between data processing systems.

ISO 8630-1 and ISO 8630-2, together with the labelling scheme specified in ISO 7665, provide for full data interchange between data processing systems.

ISO 8630-1 and ISO 8630-3, together with the labelling scheme specified in ISO 9293, provide an alternative method of full data interchange between data processing systems.

1 Scope and field of application

This part of ISO 8630 specifies the dimensional, physical and magnetic characteristics of the cartridge so as to provide physical interchangeability between data processing systems.

NOTE — Numeric values in the SI and/or Imperial measurement system in this part of ISO 8630 may have been rounded off and therefore are consistent with, but not exactly equal to, each other. Either system may be used, but the two should be neither intermixed nor re-converted. The original design was made using Imperial units and further developments were made using SI units.

2 Conformance

A flexible disk cartridge shall be in conformance with ISO 8630 when it meets all the requirements of this part of ISO 8630 and all those of either ISO 8630-2 or ISO 8630-3.

3 References

ISO 646, *Information processing — ISO 7-bit coded character set for information interchange.*

ISO 2022, *Information processing — ISO 7-bit and 8-bit coded character sets — Code extension techniques.*

ISO 4873, *Information processing — ISO 8-bit code for information interchange — Structure and rules for implementation.*

ISO 6429, *Information processing — ISO 7-bit and 8-bit character sets — Additional control functions for character-imaging devices.*

ISO 7665, *Information processing — File structure and labelling of flexible disk cartridges for information interchange.*

ISO 9293, *Information processing — Volume and file structure of flexible disk cartridges for information interchange.*

4 Definitions

For the purpose of ISO 8630 the following definitions apply.

4.1 flexible disk: A flexible disk which accepts and retains on the specified side or sides magnetic signals intended for input/output and storage purposes of information data processing and associated systems.

4.2 Reference Flexible Disk Cartridge: A flexible disk cartridge arbitrarily selected for a given property for calibrating purposes.

4.3 Secondary Reference Flexible Disk Cartridge: A flexible disk cartridge intended for routine calibrating purposes, the performance of which is known and stated in relation to that of the reference flexible disk cartridge.

4.4 Signal Amplitude Reference Flexible Disk Cartridge: A reference flexible disk cartridge selected as a standard for recording field and signal amplitude.

NOTE — A master standard for signal amplitudes reference field, overwrite and resolution characteristics has been established by the Physikalisch-Technische Bundesanstalt (PTB) Bundesallee 100 in Braunschweig, Germany, F.R. Secondary reference flexible disk cartridges can be ordered from PTB Lab 1.41 under part number RM 8630 as long as available. This material is also available through the U.S. National Bureau of Standards (NBS)[1] under the part number RM 8630.

4.5 Typical Field: In the plot of average signal amplitude against recording field, at the specified track location and flux transition density, the Typical Field is the minimum field which causes an average signal amplitude equal to 95 % of the maximum average signal amplitude.

4.6 Reference Field: The Typical Field of the reference flexible disk cartridge for recording field and signal amplitude.

There are two Reference Fields, one for each side.

4.7 Test Recording Current (for each side): The current between 145 % and 155 % of the current which produces the Reference Field at 250 000 flux transitions per second (ftps) on track 00.

There are two Test Recording Currents, one for each side.

4.8 Standard Reference Amplitude (SRA): The average signal amplitudes derived from the reference tracks on the signal amplitude reference flexible disk cartridge using the appropriate Test Recording Current.

There are four Standard Reference Amplitudes, two for each side.

SRA_{1f} is the average signal amplitude from a recording written using 250 000 ftps at track 00.

SRA_{2f} is the average signal amplitude from a recording written using 500 000 ftps at track 76 (see 9.1.4).

4.9 Average Signal Amplitude: The arithmetically averaged value for a track of the output voltages measured peak-to-peak over the whole track.

4.10 In-contact: An operating condition in which the magnetic surface of the disk intended for data storage is in physical contact with the magnetic heads.

4.11 formatting: Writing the proper control information, establishing the physical tracks and designating the addresses of physical records on the flexible disk surfaces.

4.12 initialization: Writing any information initially required to be on the flexible disk cartridge, for example the ERMAP Label, prior to the commencement of general processing.

4.13 recording area: That area of each disk surface with which the head may come into contact.

5 General description

5.1 General figures

A typical flexible disk cartridge is represented in figures 1 to 3 as follows:

Figure 1 — Flexible disk cartridge, shows the cartridge seen from above, side 0 up.

Figure 2 — Section A-A, is a cross-section along line A-A in figure 1.

Figure 3 — Protective envelope with cartridge, shows a protective envelope with cartridge, side 1 up.

5.2 Main elements

The main elements of this flexible disk cartridge are

- the recording disk;
- the liner;
- the jacket.

The cartridge is stored in an envelope.

5.3 Description

The jacket is of a square form. It includes a central window, an index window, and a head window in both sides.

The liner is fixed to the inside of the jacket. It comprises two layers of material between which the disk is held. The liner has the same openings as the jacket.

The disk has only a central hole and an index hole.

5.4 Optional features

The interchange characteristics of the jacket allow for variations of its construction as follows:

a) the jacket may include flaps (for example three flaps as shown in figure 2, or none); and

b) notches along the reference edge.

6 General requirements

6.1 Environment and transportation

6.1.1 Testing environment

Tests and measurements made on the cartridge to check the requirements of ISO 8630 shall be carried out under the following conditions:

- temperature: 23 ± 2 °C (73 ± 4 °F);
- relative humidity: 40 to 60 %;
- conditioning before testing: 24 h minimum.

1) NBS, Office of Standard Reference Materials, Room 311, Chemistry Building, Gaithersburg, MD 20899, USA.

The temperature and the relative humidity shall be measured in the air immediately surrounding the cartridge.

The stray magnetic field at any point on the disk surface, including that resulting from the concentrating effect of the recording head, shall not exceed 4 000 A/m (50 Oe).

6.1.2 Operating environment

Cartridges used for data interchange shall be operated under the following conditions:

- temperature: 10 to 51,5 °C (50 to 125 °F);
- relative humidity: 20 to 80 %;
- wet-bulb temperature: less than 29 °C (84 °F).

The temperature and the relative humidity shall be measured in the air immediately surrounding the cartridge. It is recommended that the rate of change of the temperature should not exceed 20 °C (36 °F) per hour.

There shall be no deposit of moisture on or in the cartridge.

The stray magnetic field at any point on the disk surface, including that resulting from the concentrating effect of the recording head, shall not exceed 4 000 A/m (50 Oe).

6.1.3 Storage environment

During storage the cartridges shall be kept under the following conditions:

- temperature: 4 to 51,5 °C (40 to 125 °F);
- relative humidity: 8 to 80 %.

Each cartridge shall be in an envelope and in an upright position.

There shall be no deposit of moisture on or in the cartridge.

The ambient stray magnetic field at any point on the disk surface shall not exceed 4 000 A/m (50 Oe).

NOTE — Cartridges which have been stored at temperatures and humidities outside the operating conditions may exhibit degraded performance characteristics. Such cartridges should be subjected to a conditioning period of not less than 24 h within the operating environment prior to use.

6.1.4 Transportation

Responsibility for ensuring that adequate precautions are taken during transportation shall be with the sender. During transportation the cartridge shall be in its envelope and in a protective package. The latter shall be free from dust or extraneous matter. It shall have a clean interior and construction to minimize ingress of dust and moisture. It is recommended that a sufficient space exists between cartridge and outer surface of the final container, so that risk of damage due to stray magnetic fields will be negligible.

It is recommended that the following conditions are not exceeded:

- temperature: −40 to +51,5 °C (−40 to +125 °F);
- maximum rate of temperature change: 20 °C (36 °F) per hour;
- relative humidity: 8 to 90 %.

There should be no deposit of moisture on or in the cartridge.

6.1.5 Handling

The cartridge shall stay out of its envelope for the shortest time possible. When handling the cartridge the operator shall not touch the exposed magnetic surfaces of the disk and shall avoid exposing the cartridge to direct sunlight, moisture and dust.

6.2 Materials

6.2.1 Jacket

The jacket may be constructed from any suitable material.

6.2.2 Liner

The material of the liner shall be able to retain dust without damage to the disk.

6.2.3 Disk

The disk may be constructed from any suitable material (for example bi-axially oriented polyethylene terephthalate) coated on both sides with a strong and flexible layer of magnetic material (for example Co-γFe_2O_3).

6.2.4 Envelope

The envelope may be manufactured from any suitable material (for example paper).

6.3 Direction of rotation

The direction of rotation shall be counterclockwise when looking at side 0.

7 Dimensional characteristics

The dimensional characteristics listed in the following clauses are indicated in figures 4 to 7.

Figure 4 — Jacket dimensions, shows the jacket.

Figure 5 — Cartridge thickness, shows a partial cross-section of the jacket.

Figure 6 — Disk dimensions, shows the disk.

Figure 7 — Disk thickness, shows a cross-section of the disk.

All dimensions are referred to the reference edge of the cartridge (see figure 4).

7.1 Jacket

7.1.1 Form

The jacket shall have a square form with angles of 90° ± 30' and a side length

l_1 = 133,3 ± 0,4 mm (5.250 ± 0.015 in)

7.1.2 Thickness

7.1.2.1 Jacket wall and liner

In an area defined by

r_1 = 35 mm (1.38 in)

r_2 = 50 mm (1.97 in)

and with a probe having a diameter of 15 mm (0.59 in) applied against the cartridge with a force of 1 N (3.6 ozf), the thickness of the jacket wall and liner shall be

e_1 = 0,45 ± 0,15 mm (0.018 ± 0.006 in)

7.1.2.2 Cartridge

The overall thickness of the cartridge shall be (see also 7.1.7)

1,2 mm (0.047 in) $< e_2 <$ 2,1 mm (0.083 in),

when measured according to clauses A.1 and A.2 of annex A.

The cartridge shall fall freely through a gauge with a $2{,}60^{+0{,}05}_{-0{,}00}$ mm ($0.102^{+0.002}_{-0.000}$ in) wide opening having flat, vertical walls and a depth of 150 mm (5.9 in).

7.1.3 Central windows

The central windows shall have a diameter

d_1 = 39,7 ± 0,2 mm (1.56 ± 0.01 in)

The position of their centre is defined by

l_2 = 66,65 ± 0,30 mm (2.624 ± 0.012 in)

7.1.4 Index windows

7.1.4.1 Location

The centre of the index windows shall be defined by

l_3 = 42,10 ± 0,25 mm (1.657 ± 0.010 in)

l_4 = 60,00 ± 0,25 mm (2.362 ± 0.010 in)

7.1.4.2 Diameter

The diameter of the index windows shall be defined by

d_2 = 6,35 ± 0,20 mm (0.250 ± 0.008 in)

7.1.5 Head windows

7.1.5.1 Location

The location of the lowest point of the head windows shall be defined by

l_5 = 3,30 ± 0,25 mm (0.130 ± 0.010 in)

7.1.5.2 Dimensions

The width of the head windows shall be

l_6 = 12,7 ± 0,2 mm (0.500 ± 0.008 in)

The nominal radius of their ends shall be

r_3 = 6,35 mm (0.250 in)

Their length shall be

l_7 = 35,00 ± 0,25 mm (1.378 ± 0.010 in)

7.1.6 Reference edge profile

Within an area defined by

l_8 = 25 mm (1.0 in)

the Reference Edge shall have a convex profile, for example be rounded off with one or more radii of 0,3 mm min. (0.012 in min.).

7.1.7 Construction of the jacket

If the jacket utilizes flaps, their width shall not exceed

l_9 = 12 mm (0.47 in)

The total thickness e_2 of the cartridge with flaps shall satisfy the conditions of 7.1.2.2 (see annex A).

7.1.8 Notches

Two notches may be provided along the Reference Edge. If provided, they shall be entirely contained within areas defined by:

l_{10} = 48,0 mm min. (1.89 in min.)

l_{11} = 58,0 mm max. (2.28 in max.)

l_{12} = 75,0 mm min. (2.95 in min.)

l_{13} = 85,5 mm max. (3.37 in max.)

l_{14} = 2,0 mm max. (0.08 in max.)

7.1.9 Write-enable notch

The position and size of the write-enable notch shall be defined by:

l_{19} = 96,5 ± 0,2 mm (3.799 ± 0.008 in)

l_{20} = 6,35 ± 0,13 mm (0.25 ± 0.005 in)

l_{21} = 3,8 ± 0,2 mm (0.150 ± 0.008 in)

Writing is inhibited by covering the notch with a material of sufficient stiffness and/or opacity.

7.2 Liner

The liner shall extend across the recording area (7.3.4). However, no part of the liner shall protrude by more than 0,5 mm (0.019 in) into the openings of the jacket.

7.3 Disk

7.3.1 Diameter

The external diameter of the disk shall be

d_3 = 130,2 ± 0,2 mm (5.125 ± 0.008 in)

The inner diameter of the disk shall be

d_4 = 28,575 ± 0,025 mm (1.125 ± 0.001 in)

7.3.2 Thickness

The thickness of the disk shall be

e_3 = 0,080 ± 0,010 mm (0.003 0 ± 0.000 4 in)

7.3.3 Index hole

7.3.3.1 Location

The location of the index hole shall be defined by

r_4 = 25,4 ± 0,1 mm (1.000 ± 0.004 in)

7.3.3.2 Diameter

The diameter of the index hole shall be

d_5 = 2,54 ± 0,10 mm (0.100 ± 0.004 in)

7.3.4 Recording area

The recording area shall be defined, on each side, by

r_5 = 31,3 mm max. (1.23 in max.)

r_6 = 62,5 mm min. (2.46 in min.)

7.3.5 Sides

For convenience of description the two sides are defined as Side 0 and Side 1; they are shown in figures 1 to 4 and figure 8.

8 Physical characteristics

8.1 Flammability

The cartridge shall be made from materials that, if ignited from a match flame, do not continue to burn in a still carbon dioxide atmosphere.

8.2 Coefficient of linear thermal expansion of the disk

The coefficient of thermal expansion of the disk shall be

(17 ± 8) × 10^{-6} per degree Celsius

8.3 Coefficient of linear hygroscopic expansion of the disk

The coefficient of hygroscopic expansion of the disk shall be

(0 to 15) × 10^{-6} per percent of relative humidity

8.4 Opacity

8.4.1 Opacity of the jacket

The jacket shall have a light transmittance of less than 1 % using an LED with a nominal wavelength of 940 nm as the radiation source when measured according to annex B. Write enable notch covering means are included in the jacket for opacity.

8.4.2 Opacity of the disk

The disk shall have a light transmittance of less than 2 % using an LED with a nominal wavelength of 940 nm as the radiation source when measured according to annex B.

8.5 Torque

8.5.1 Starting torque

The starting torque, without heads and pads loaded to the cartridge, shall not exceed 0,01 N·m (1.42 ozf·in).

8.5.2 Running torque

When the disk cartridge is tested at a rotational speed of 360 ± 7 r/min, with a pressure pad of 280 ± 10 mm^2 (0.434 ± 0.015 in^2) surface applied with a force of 0,70 ± 0,05 N (2.52 ± 0.18 ozf) and located parallel to the head windows as defined in figure 8 by

l_{15} = 44 mm (1.73 in)

l_{16} = 55 mm (2.16 in)

l_{17} = 7 mm (0.28 in)

l_{18} = 35 mm (1.38 in)

the torque necessary to rotate the disk shall not exceed 0,03 N·m (4.26 ozf·in).

9 Magnetic characteristics

9.1 Track geometry

9.1.1 Number of tracks

There shall be 80 discrete concentric tracks on each side of the disk in the recording area (7.3.4) for data interchange.

9.1.2 Width of tracks

The recorded track width on the disk surface shall be

0,155 ± 0,015 mm (0.006 1 ± 0.000 6 in)

The area between the tracks shall be erased. The method of measuring effective track width is given in annex C.

9.1.3 Track location

9.1.3.1 Nominal locations

The nominal radius of the centrelines of all tracks shall be calculated by using the formula:

$$R_n = X - \frac{n}{96} \times 25{,}4 \text{ mm}$$

$$\left(R_n = X - \frac{n}{96} \text{ in} \right)$$

where

n is the numeric value corresponding to the track number (see 9.1.4)

X = 57,150 mm for side 0 (2.250 0 in)

X = 55,033 mm for side 1 (2.166 7 in)

Therefore, each track on side 1 is offset inwards by 2,117 mm (0.083 3 in) from the track on side 0 having the same track number.

9.1.3.2 Track location tolerance

For testing purposes, the centrelines of the recorded tracks shall be within ± 0,025 mm (± 0.001 in) of the nominal positions, when measured in the testing environment (see 6.1.1).

9.1.4 Track number

The track number shall be a two-digit decimal number (00 to 79 for each side) which identifies the tracks consecutively, starting at the outermost track (track 00).

9.1.5 Index

The index signal shall only be used for timing purposes. The index is the point which determines the beginning and the end of the track. At the instant of having detected the leading edge of the index hole, the index is under the read-write gap.

9.2 Functional testing

For the purpose of the following tests the same drive unit shall be used for writing and reading operations.

The in-contact operating condition shall be used.

9.2.1 Surface tests

The magnetic properties of both data surfaces are defined by the testing requirements given below.

The tests defined in 9.2.1.3 and 9.2.1.4 are performed on track 76 as these are the certified tracks of RM 8630.

9.2.1.1 Test conditions

The disk shall be tested at 360 ± 7 r/min. The test frequencies [flux transitions per second (ftps)] used shall be

$1f$ = 250 000 ± 250 ftps

$2f$ = 500 000 ± 500 ftps

The frequency(ies) to be used is (are) specified for each test.

9.2.1.2 Typical Field

For each side, the Typical Field of the disk under test shall be within ± 20 % of the Reference Field. It shall be measured using $1f$ on track 00.

9.2.1.3 Average Signal Amplitude

When the disk under test has been recorded with the Test Recording Current, then read back and compared with the Signal Amplitude Reference Flexible Disk Cartridge recorded under the same conditions, and on the same system the Average Signal Amplitude shall be

track 00, using $1f$: less than 130 % of SRA_{1f}, for each side;

track 76, using $2f$: more than 80 % of SRA_{2f}, for each side.

9.2.1.4 Resolution

After recording, using the appropriate Test Recording Current, on track 76 of each side, the ratio

$$\frac{\text{Average Signal Amplitude using } 2f}{\text{Average Signal Amplitude using } 1f}$$

shall be greater than 90 % of the same ratio for the signal amplitude reference flexible disk cartridge.

9.2.1.5 Overwrite

On track 00, after recording with the appropriate Test Recording Current, first using $1f$ and then overwriting with $2f$ for one revolution, the ratio

$$\frac{\text{Residual Average Signal Amplitude at } 1f \text{ after overwrite using } 2f}{\text{Average Signal Amplitude after first recording using } 1f}$$

shall be less than 150 % of the value of the same ratio for the Signal Amplitude Reference Flexible Disk Cartridge. This test shall be performed on both sides, with a frequency-selective voltmeter with a bandwidth in the range of 1 to 5 kHz.

9.2.1.6 Modulation

The modulation shall be

$$\frac{\text{Maximum mean} - \text{Minimum mean}}{\text{Maximum mean} + \text{Minimum mean}} \times 100\ \%$$

The maximum mean shall be the average value of the amplitude modulated output voltage in that part of the track with the maximum amplitudes, and the minimum mean shall be that in the respective part with the minimum amplitudes. Output voltage shall be measured peak-to-peak; averaging shall be done over approximately 2 000 consecutive flux transitions.

On both sides, using $1f$ on track 00, and using $2f$ on track 79, modulation shall be less than 10 %.

9.2.2 Track quality tests

These tests shall apply to all usable tracks at the defined positions on each side. The Test Recording Current shall be used.

9.2.2.1 Missing pulse

Write a track at $2f$ with the appropriate Test Recording Current. Any playback signal, when measured base-to-peak, which is less than 40 % of half the arithmetically averaged value of the output voltages measured peak-to-peak over a whole track, shall be a missing pulse.

9.2.2.2 Extra pulse

Write a track at $2f$ with the appropriate Test Recording Current. Erase for one revolution with a constant direct current equivalent to the quiescent value of the Test Recording Current.

Any playback signal which, when measured base-to-peak, including the statistical noise and the residual signal of the disk, exceeds 20 % of half the Average Signal Amplitude at $2f$ of the track under test shall be an extra pulse.

9.2.3 Rejection criteria

9.2.3.1 Defective track

A track on which one or more missing and/or extra pulses are detected in the same position(s) on consecutive passes shall be a defective track. The applicable number of consective passes shall be a matter of agreement between the interested parties.

9.2.3.2 Requirements for tracks

As initially received from the medium supplier, the cartridge shall have no defective track.

9.2.3.3 Rejected cartridge

A cartridge which does not meet the requirements of 9.2.3.2 shall be rejected.

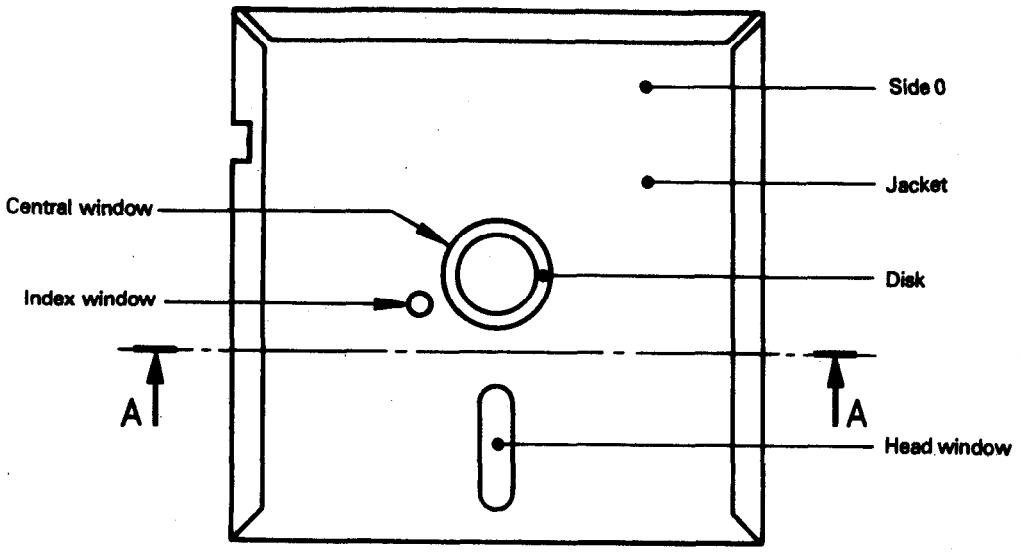

Figure 1 — Flexible disk cartridge

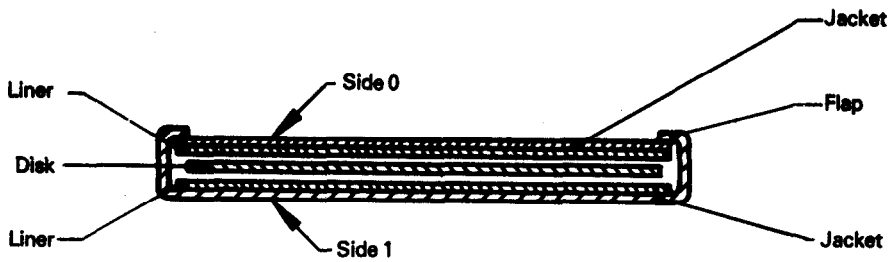

Figure 2 — Section A-A

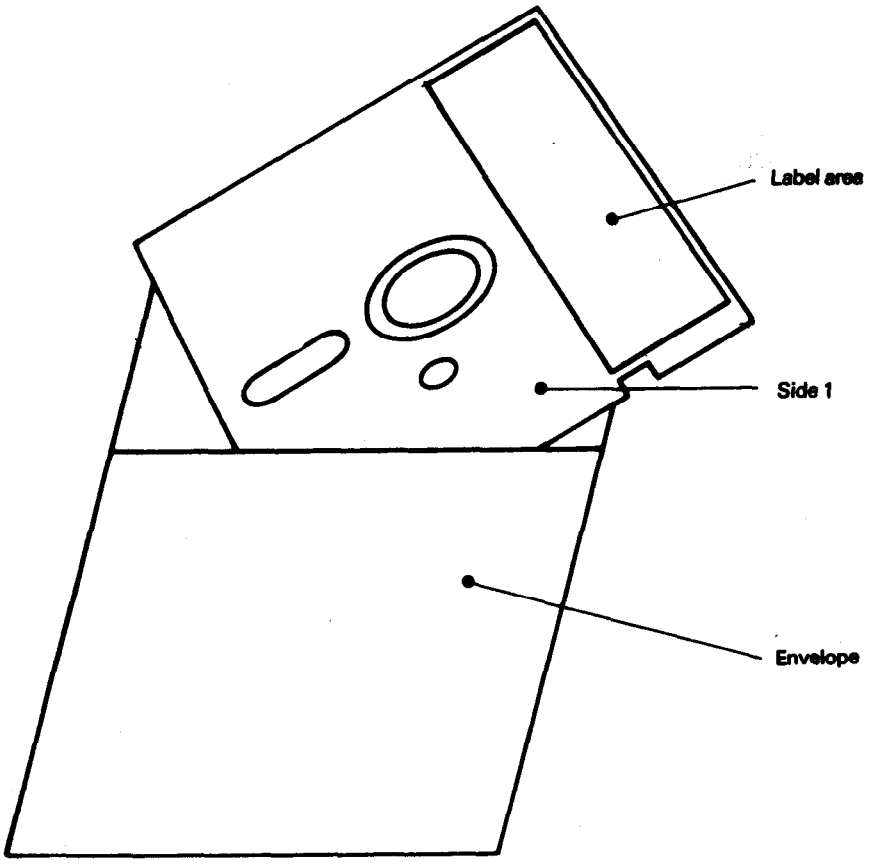

Figure 3 — Protective envelope with cartridge

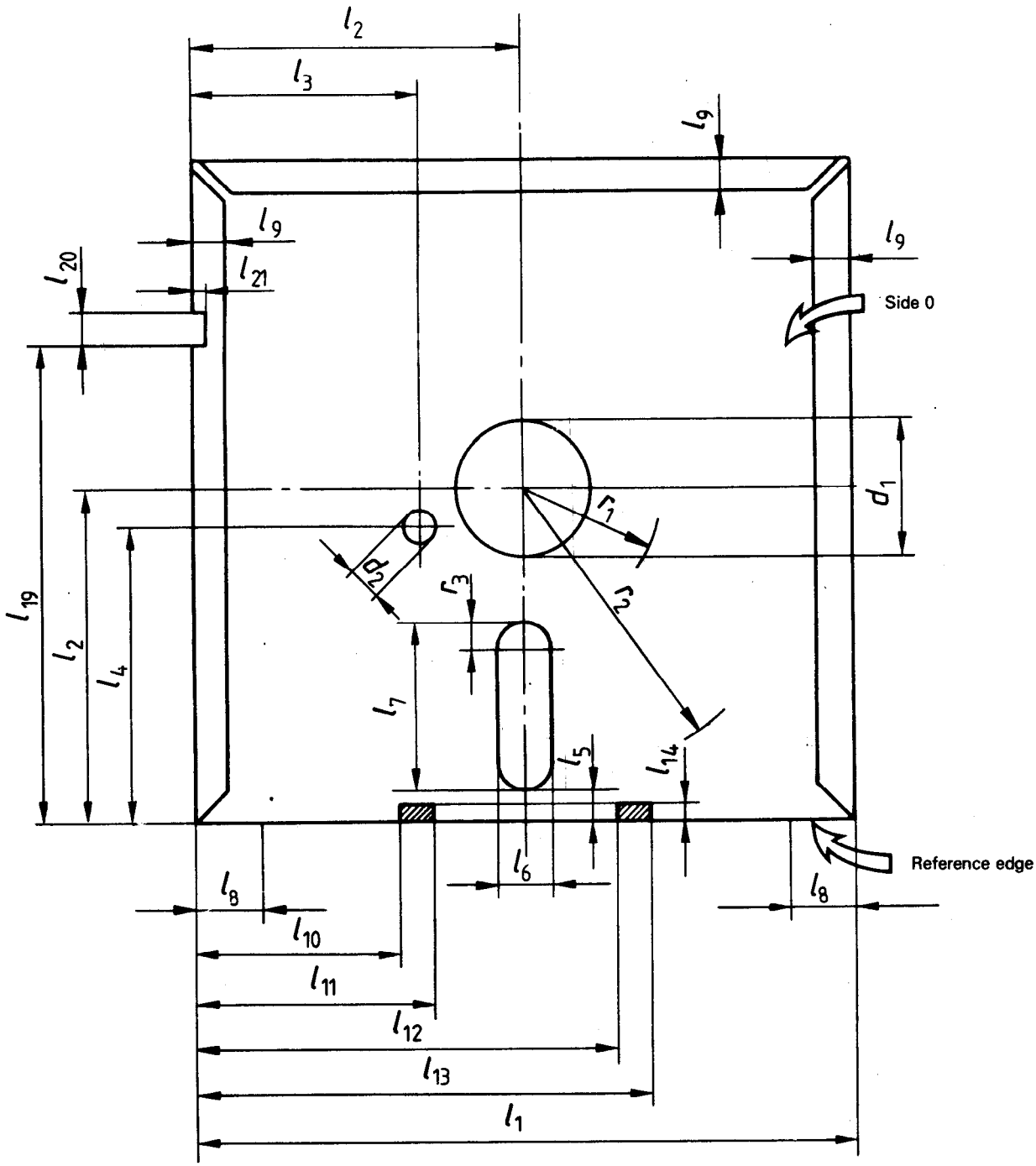

Figure 4 — Jacket dimensions

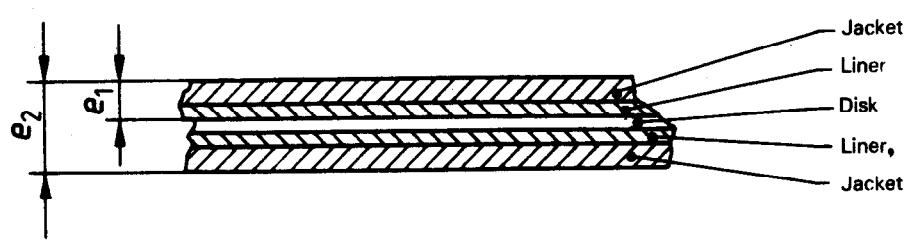

Figure 5 — Cartridge thickness

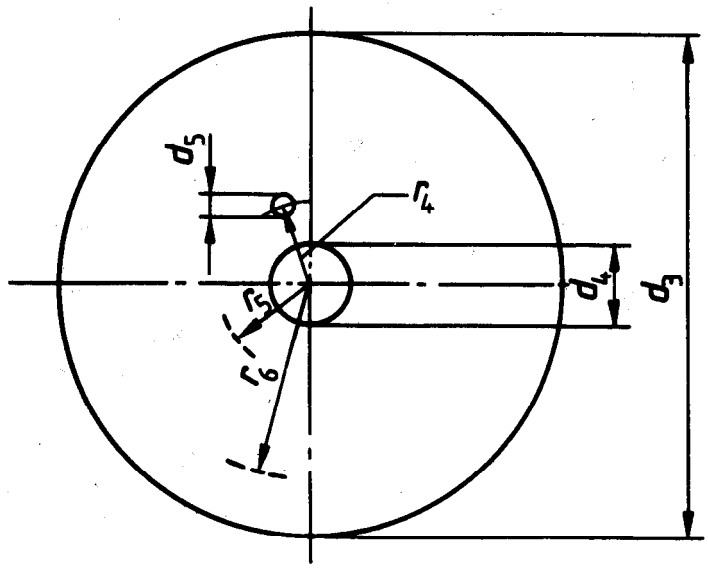

Figure 6 — Disk dimensions

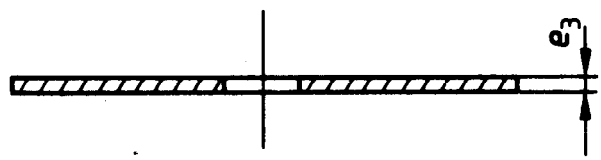

Figure 7 — Disk thickness

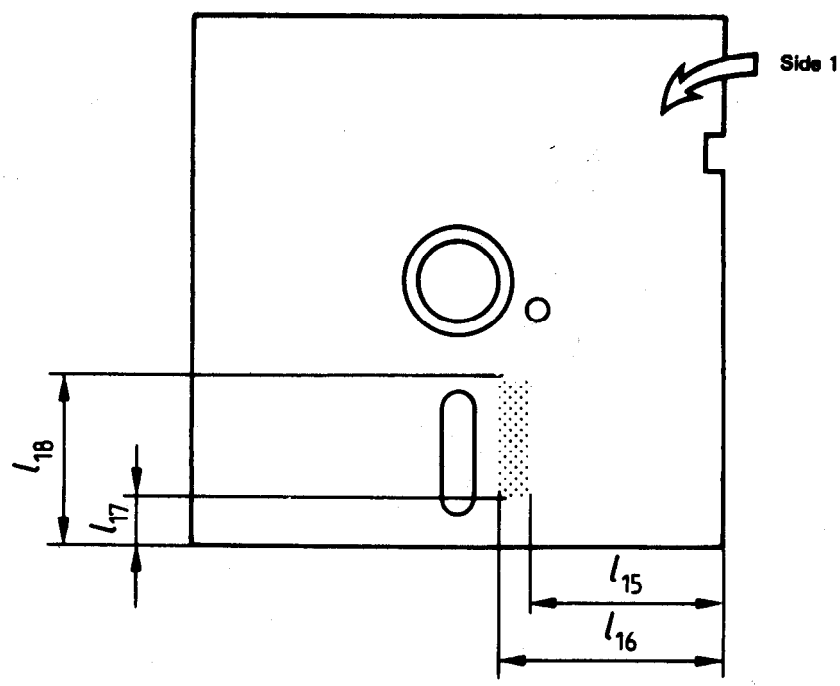

Figure 8 — Pressure pad area

Annex A

Measurement of the cartridge thickness

(This annex forms part of the standard.)

A.1 Maximum thickness

This value shall be measured for all edges using the gauge of figure 9. The cartridge shall be capable of entering the gauge for at least 15 mm (0.59 in) when a force of 1 N (3.6 ozf) is applied on the opposite edge.

Dimensions in millimetres
(Dimensions in inches in parentheses)

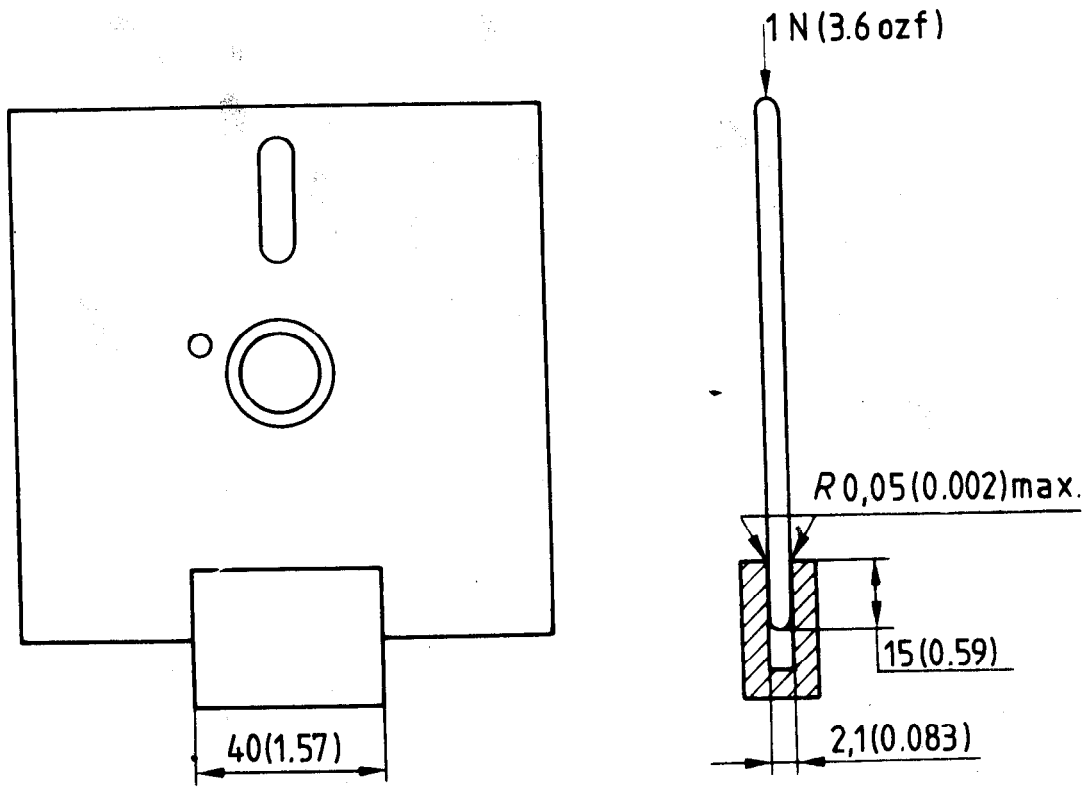

Figure 9 — Measuring gauge

A.2 Minimum thickness

This value shall be measured for all edges using the gauge of figure 10. This gauge has a length of 40 mm (1.57 in). When submitted to a force of 1 N (3.6 ozf) the cartridge shall enter the slot to a depth of less than 1 mm (0.039 in).

Dimensions in millimetres
(Dimensions in inches in parentheses)

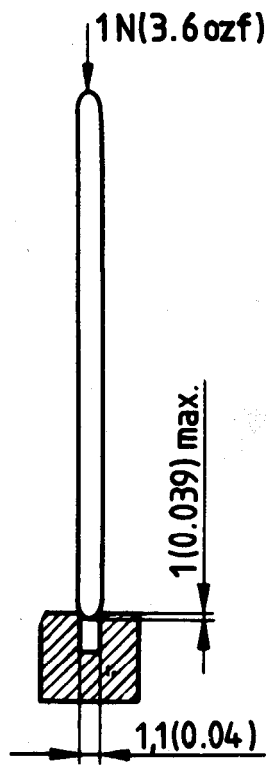

Figure 10 — Measuring gauge

Annex B

Measurement of light transmittance

(This annex forms part of the standard.)

B.0 Introduction

The following description outlines the general principle of the measuring equipment and the measuring method to be applied when measuring the radiation (light) transmittance of the jacket and of the magnetic disk.

For the purpose of this part of ISO 8630 "light transmittance" is defined by convention as the relationship between the reading obtained from the test device with the sample inserted and the reading obtained when no sample is present. The transmittance value is expressed as the percentage ratio of the two readings.

The essential elements of the measuring equipment are

- the radiation source;
- the photo diode;
- the optical path;
- the measuring circuitry.

B.1 Description of the measuring equipment

B.1.1 Radiation source

An infra red light-emitting diode (LED) with the following parameters shall be used:

Wavelength at peak emission $\lambda_{peak} = 940 \pm 10$ nm

Half-power band width $b = \pm 50$ nm

B.1.2 Radiation receiver

A flat silicon photo diode shall be used as the radiation receiver. It shall be operated in the short-circuit mode. The active area of the diode shall be equal to, or at the most 20 % larger than, the open area of the aperture. This condition guarantees a linear dependency of the short-circuit diode current on the light intensity.

B.1.3 Optical path (see figure 11)

The optical axis of the device shall be perpendicular to the disk.

The distance from the emitting surface of the LED to the disk shall be

$$L_1 = \frac{d_{max}}{2 \tan \alpha}$$

where

d_{max} is the maximum diameter of the index hole;

α is the angle where the relative intensity of the LED is equal to, or greater than, 95 % of the maximum intensity of the optical axis.

The aperture shall have a thickness of 1,2 to 1,4 mm and a diameter given by

$$D = (2 L_2 \tan \alpha) \text{ mm}$$

$$L_2 = (L_1 \pm 1{,}5) \text{ mm}$$

Its surfaces shall be matt black. The whole device should be enclosed within a light-tight casing.

B.1.4 Measuring circuitry

Figure 13 shows the recommended circuitry with the following components:

E: regulated power supply with variable output voltage
R: current-limiting resistor
LED: light-emitting diode
D_i: Si photo diode
A: operational amplifier
R_{f0}, R_{f1}: feedback resistors
S: gain switch
V: voltmeter

The forward current of the LED and consequently its radiation power can be varied by means of the power supply E. D_i is working in the short-circuit mode. The output voltage of the operational amplifier is given by

$$V_0 = I_k R_f$$

and is therefore a linear function of the light intensity. I_k is the short-circuit current of D_i.

R_{f0} and R_{f1} shall be low-temperature drift resistors with an accuracy of 1 %. The following ratio applies

$$\frac{R_{f0}}{R_{f1}} = \frac{1}{50}$$

B.2 Measuring method

B.2.1 Measurement of the disk

The measurements shall be taken within an annular band the boundaries of which are tangential to the index hole.

- S is set to position 0. With the index hole in front of the photo diode, the voltmeter is set to full-scale reading (100 % transmittance) by varying the output voltage of E.
- The disk is rotated until the photo diode is covered by the disk. S is set to position 1. Full deflection of the voltmeter now represents 2 % transmittance.

The disk is rotated slowly for one revolution and readings of the voltmeter are taken.

B.3.2 Measurement of the jacket

The same procedure applies to the jacket measurement, except that the jacket without a disk shall be rotated.

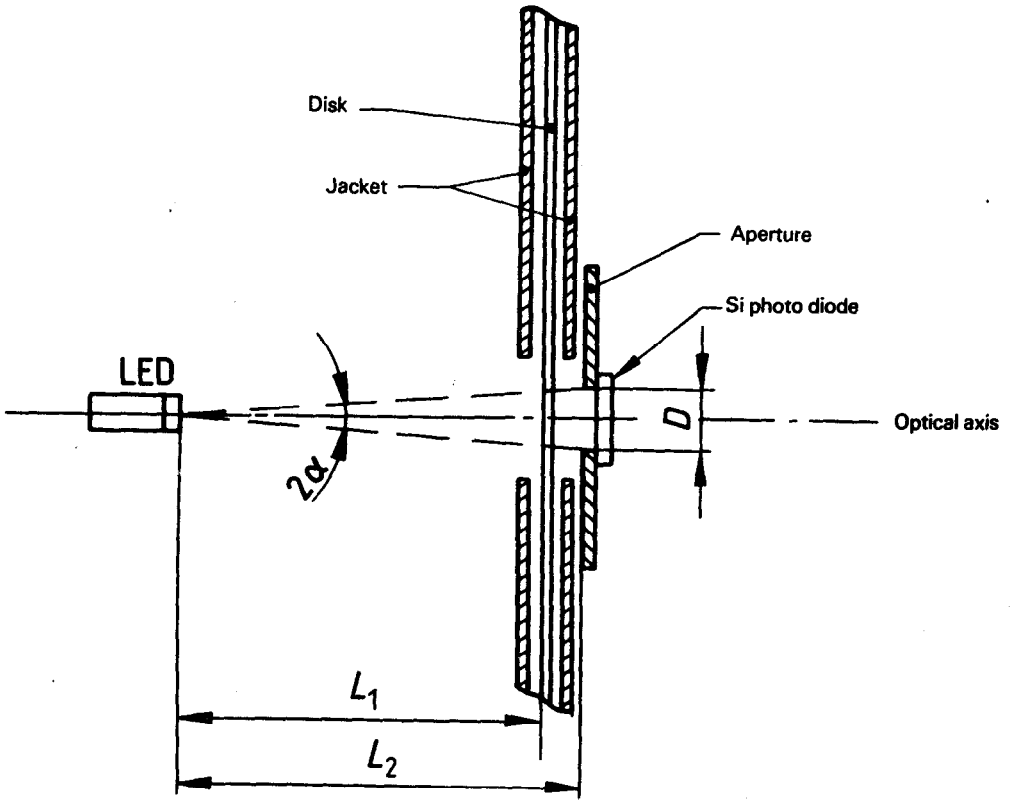

Figure 11 — Measuring device

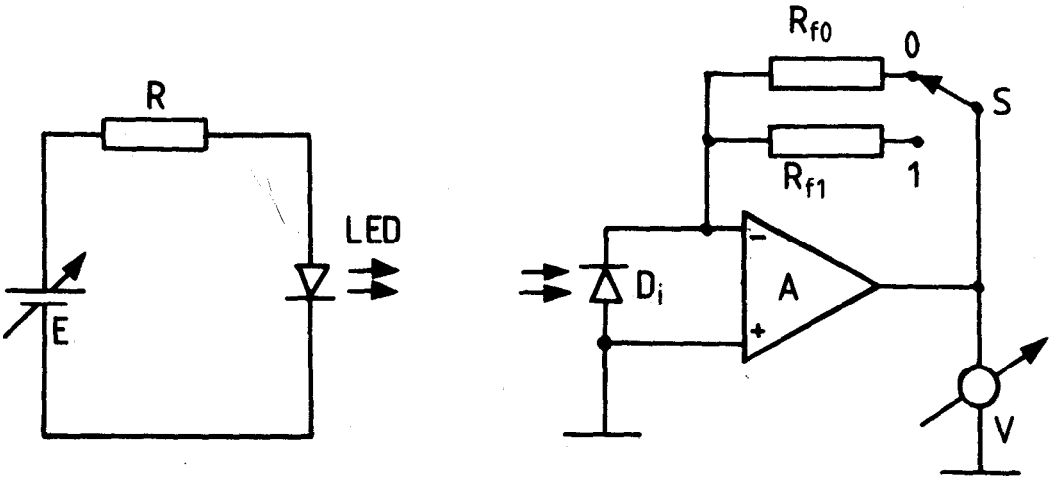

Figure 12 — Electronic circuitry

Annex C

Method for measuring the effective track width

(This annex forms part of the standard.)

DC erase a 7-track wide band. Record a 250 000 ftps frequency pattern in a track centred in the middle of the erased band, with the read/write head with the erase element active. Measure the output voltage.

Move the head radially over the disk in increments not greater than 0,01 mm (0.000 4 in) to the left and to the right until the read back signal has decreased by 75 %. Determine the read back signal amplitude for each incremental move and plot its amplitude versus displacement. See figure 13 for reading the half track width A and B for both sides of displacement provided the gap width of the head used is not smaller than the effective track width. The total effective track width is the sum of A and B.

Repeat the test to ensure that no thermal or hygroscopic effects have taken place during the measurement.

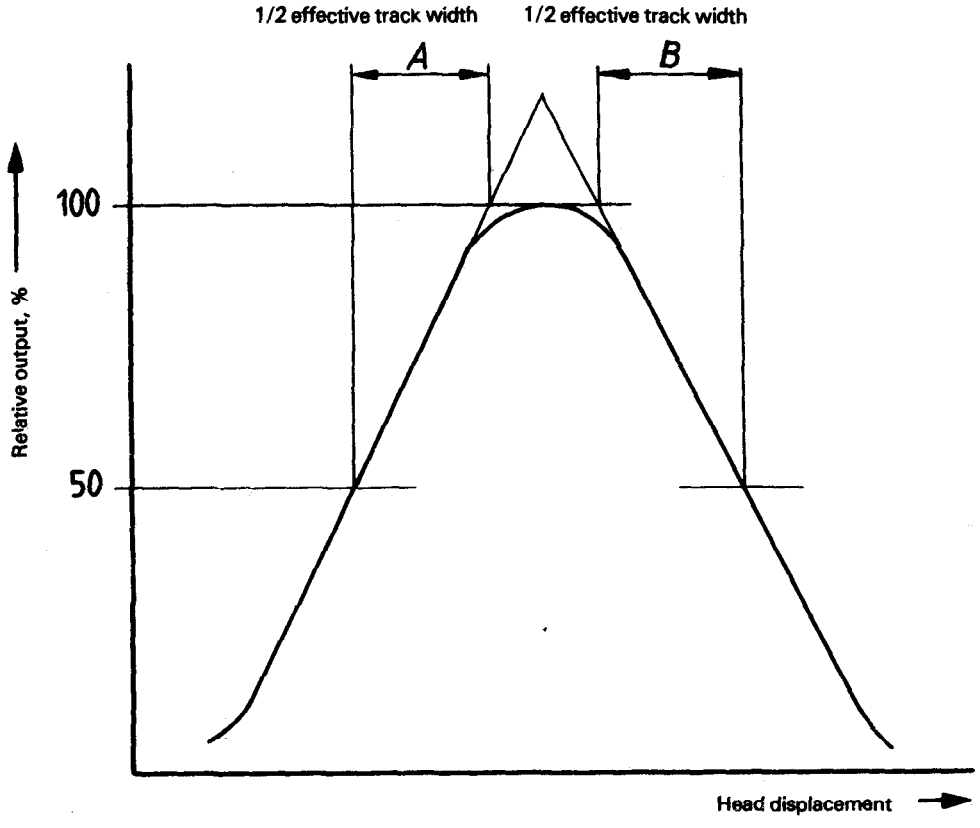

Figure 13 — Track width

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